



CLAIMS LISTING (Marked)

1-3: CANCELLED.

4. (NEWLY AMENDED) A system, comprising:

- a nozzle having an inlet, a throat, and an exhaust;
- a fluid flowing through the nozzle;
- means for electrical stimulation inducing a low energy nuclear reaction (LENR) embedded within the nozzle ~~for transferring energy into and heating the nozzle~~, thereby indirectly transferring energy into and heating the fluid and inducing a phase change in the fluid; and,
- means for transforming the flow from the exhaust into work outside the system.

5 (ORIGINAL). A system as in Claim 4, wherein the cross-sectional interior volume of the inlet, throat, and exhaust of the nozzle vary only across one plane perpendicular to the axis of fluid flowing through the nozzle.

6. (ORIGINAL) A system as in Claim 4, further comprising a surfactant having an extra ion dissolved in the fluid.

7. (ORIGINAL) A system as in Claim 6, wherein the surfactant is a short-chain molecule.

8. (ORIGINAL) A system as in Claim 6, wherein the surfactant is a short-chain molecule having only 5 to 50 atoms.

9. (ORIGINAL) A system as in Claim 6, wherein the surfactant is a short-chain molecule having only 5 to 10 atoms.

10. (ORIGINAL) A system as in Claim 6, wherein the fluid includes a lithium salt and the surfactant is non-reactive to the fluid and lithium salt.

24. (NEW) A system as in Claim 10, wherein the nozzle further comprises:
a third block of an insulating material separating a first structural core and a heat transference block.

25. (NEW) A system as in Claim 24, wherein the third block further comprises:
a first sub-layer of an electrical insulating material; and,
a second sub-layer of a thermal insulating material.

26. (NEW) A system as in Claim 24, wherein means embedded within the nozzle for transferring energy into and heating the nozzle, thereby indirectly transferring energy into and heating the fluid and inducing a phase change in the fluid further comprise:
a structural core formed of a first material;
a heat transference block formed of a second material, said heat transference block having at least one surface over which the fluid flows and from which heat is transferred from the heat transference block to the fluid; and,
means for inducing a low-energy nuclear reaction within the heat transference block to create heat in the heat transference block.

27. (NEW) A system as in Claim 26, wherein the fluid includes deuterium.

28. (NEW) A system as in Claim 26, wherein the second material is a metal alloy whose principal component comes from the following set of materials: palladium, lanthanum, praseodymium, cerium, titanium, zirconium, hafnium, vanadium, niobium, tantalum, nickel, thorium, protactinium, and uranium.

29. (NEW) A system as in Claim 26, wherein the second material is palladium.

30. (NEW) A system as in Claim 26, wherein the means for inducing a low-energy nuclear reaction within the heat transference block to create heat in the heat transference block further comprise:
an anode; and,

means for electrically stimulating the heat transference block by passing a current between the anode and the heat transference block.

31. (NEW) A system as in Claim 30 wherein the electrical stimulation of the heat transference block varies periodically.

32. (NEW) A system as in Claim 30, wherein the stimulation of the heat transference block occurs in a periodic pattern of increasing impulses.

33. (NEW) A system as in Claim 26, wherein the means for inducing a low-energy nuclear reaction in the heat transference block further comprise at least one laser in the nozzle whose emission is directed against the heat transference block.

34. (NEW) A system as in Claim 33, wherein the laser is capable of variable emission.

35. (NEW) A system as in Claim 26, wherein the means for inducing a low-energy nuclear reaction within the heat transference block to create heat in the heat transference block further comprise:

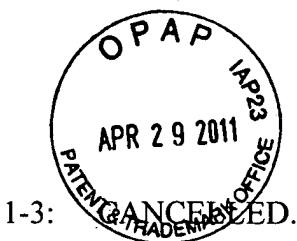
an anode;

a cathode;

means for electrically stimulating the heat transference block between the anode and cathode; and,

at least one laser whose emission affects the heat transference block.

36. (NEW) A system as in Claim 34, wherein both the laser, and the means for electrically stimulating between the anode and cathode the heat transference block, are capable of variable output.



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a structural core formed of a first material;
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an anode; and,

means for electrically stimulating the heat transference block by passing a current between the anode and the heat transference block.

31. (NEW) A system as in Claim 30 wherein the electrical stimulation of the heat transference block varies periodically.

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33. (NEW) A system as in Claim 26, wherein the means for inducing a low-energy nuclear reaction in the heat transference block further comprise at least one laser in the nozzle whose emission is directed against the heat transference block.

34. (NEW) A system as in Claim 33, wherein the laser is capable of variable emission.

35. (NEW) A system as in Claim 26, wherein the means for inducing a low-energy nuclear reaction within the heat transference block to create heat in the heat transference block further comprise:

an anode;

a cathode;

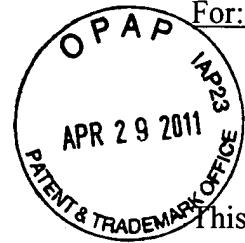
means for electrically stimulating the heat transference block between the anode and cathode; and,

at least one laser whose emission affects the heat transference block.

36. (NEW) A system as in Claim 34, wherein both the laser, and the means for electrically stimulating between the anode and cathode the heat transference block, are capable of variable output.

In Re Application Of: Brian P. Roarty
Serial No. 10/797,255
Filed: 03/10/2004
For: Implementation...

Examiner: Erin M. Boyd
Group Art Unit: 3663
Atty. Docket No:
Date: Apr. 29th, 2010



PETITION TO WITHDRAW HOLDING OF ABANDONMENT

This Petition is filed in response to the Notice of Abandonment mailed April 6, 2011 and received by this attorney on April 22, 2011. Petitioner respectfully contends that this application is not in fact abandoned and requests withdrawal of the holding of abandonment on two separate grounds: first, that the Office Action which was mailed by the PTO on 10 May 2010 was never received by the attorney for applicant; and second, that that same Office Letter was improperly sent, as it incorrectly asked for what had already been provided by the applicant on Jan. 19th, 2010.

This Petition is timely as it is filed within two months of the mailing and receipt of the Notice of Abandonment. This Petition is filed without a fee as it is filed under 37 CFR 1.181; applicant contends the application is not in fact abandoned, on alternate grounds.

EVIDENTIARY SUPPORT FOR WITHDRAWAL OF HOLDING AS THE PTO OFFICE LETTER WAS NEVER RECEIVED BY ATTORNEY

The Notice of Abandonment came as a tremendous shock to petitioner's attorney. It was the first mailing from the PTO on this application since the submittal (by fax) of a proper RCE Transmittal Cover on Jan. 27, 2010. Attorney searched his files and found no evidence of any mailing dated May 10, 2010 from the PTO, though the file for the related Continuation-in-Part (12/657,351) showed that he had sent out a Preliminary Amendment on May 12, 2010.

Attorney prepares a separate file folder for each patent application. On the front cover attorney personally writes the name of the applicant(s), the date the application is first

filed, the title of the application, and when he receives it from the PTO, the application number. Patent application files are also kept in a separate cabinet from attorney's other office files. Attorney has experienced more than one computer hard disk crash and consequential calendar and docketing loss, multiple software updates, as well as several failures of software providers (calendar and word processing) to survive – and considers the hand-written files with front dockets to be more consistently reliable, particularly as they are neither dependent upon continued electrical power or migration across multiple generations of operating systems and computers. Electronic copies of current-generation attorney-generated responses and a calendar are kept on the attorney's computer, but the hardcopy files have not died or become inaccessible, unlike the software versions.

When an Office Action requiring a response is received, attorney hand-writes it on the front of the file folder for that application; as he does any response after it has been sent. Thus the docket record is entered and visible on the front of each file folder. A photocopy of the docket record – taken before this petition was sent and thus logged – is attached as Exhibit 1. There is no entry between that of the sending of the RCE Transmittal FAX on Jan. 27, 2010 and the receipt of the Notice of Abandonment on Apr. 22, 2011.

The attorney will and does personally attest that to the best of his information, knowledge, and belief, no communication concerning this application was received from the USPTO between Jan. 27, 2010 and April 22, 2011. Attorney admits that he was recovering from cancer surgery (on Feb. 2, 2010) between that date and June 1st, 2010 and thus was not working either full time or at his best capacity. Discovery of the filing of the Preliminary Amendment in the related file, on the same date as his 3-month post-surgical review, persuades him that this applicant's matters were definitely in attorney's attention at that time; and that the lack of any knowledge of any communication from the PTO relating to the same cannot be laid to attorney's neglect or inattention.

The attorney attempted to contact the Examiner for this application to discover what had been in the Office letter mailed 10 May 2010. This took several days due to the difference in time zones and prior commitments (including judge pro tem service by

attorney). On April 28, 2011 attorney was able to talk with the Examiner. That telephone conversation is still the only source of information attorney has as to the contents of the Office letter dated 10 May 2011.

Accordingly attorney asserts that (1) the Office Action of 10 May 2010 was not received at the correspondence address of record; (2) a search of the attorney's records, including the files, that application's specific file folder, front docket, and computer calendar, and the application contents, indicate that the Office Action was not received.

For this reason, attorney respectfully petitions that the Notice of Abandonment be withdrawn.

EVIDENTIARY SUPPORT FOR WITHDRAWAL OF HOLDING AS THE PTO
OFFICE LETTER WAS IMPROPERLY SENT

As stated above, attorney spoke with the Examiner on April 28th, 2011, seeking to find out what had been in the Office Letter mailed on 10 May 2010. At that time attorney was expecting to have to prepare a Petition to Revive the application, and knew that such a petition required any missing response, i.e. the 'proper reply' which should have been originally provided.

The Examiner stated that the Office Letter of 10 May 2010 had been a request for correction, in which the "text markings" for Newly Amended Claim 4 had been requested. The Examiner could not remember whether the text markings indicating the changes in the text (i.e. the underscore and ~~strikeout~~), or the current status indicator (i.e. 'NEWLY AMENDED'), had been missing.

Attorney, while speaking with the Examiner, pulled up (on screen) and out (from the file) the material submitted on Jan. 19th, 2010 which was the subject of the 10 May 2010 mailing. Attorney discovered that both a clean (i.e. unmarked) claims listing and a

marked claims listing had been sent. At this time both attorney and Examiner realized that there may have been an error in the processing at the PTO of the Jan. 19th, 2010 submission, with the marked listing being misfiled or not entered.

A copy of the relevant parts of the Jan. 19th, 2010 submission is attached as Exhibit 2. This Exhibit includes the Express Mail label, the text of the Response, the Declaration of the Applicant, the clean claims listing, the marked claims listing, and the Express Mail Certificate.

On page 1 of the marked Claims Listing – indicated by 2 separate Post-It® notes in the paper filed with the PTO – the text of Claim 4 has all of the correct features supposedly requested in the Office Letter mailed 10 May 2010: namely, the claim is identified as “(NEWLY AMENDED)”; the text which has been added is underscored, and the text which has been deleted is stricken through.

Had attorney received the Office letter of 10 May 2010, responding to it would have required only printing out the marked claims listing, then preparing and sending an Express Mail (with certificate) response. Attorney asserts this is supplemental corroborative evidence for the lack of receipt of this mailing; it would have been much simpler to prepare and send that, than it has been to research, prepare, and send this petition.

Had the marked claims listing not been with the materials received by the PTO in the Jan. 19th Express Mail package, the PTO receiving and processing personnel would have spotted the discrepancy with the Express Mail Certificate – as apparently happened with the RCE Transmittal Form, which was corrected through Fax on Jan. 27, 2010.

Accordingly, attorney respectfully asserts that the grounds for the 10 May 2010 letter were the result of an in-processing error whereby the provided, marked, text was not delivered to the Examiner despite having been sent by attorney to the PTO.

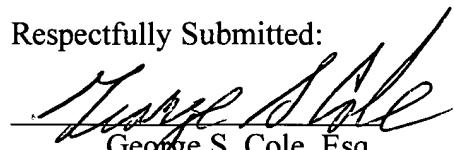
PETITIONS IN THE ALTERNATIVE;
TO REVIVE AN UNAVOIDABLY ABANDONED APPLICATION;
OR
TO REVIVE AN UNINTENTIONALLY ABANDONED APPLICATION

Finally, in the event that the foregoing petition to Withdraw a Holding of Abandonment is not granted, petitioner respectfully and doggedly requests that this application be revived.

Alternative petitions – on the grounds that the abandonment was unavoidable, and on the grounds that the abandonment was unintentional – with their respective fee payments for a small entity, are enclosed with this Petition; and if the Withdrawal of Abandonment is not granted, these are respectfully, and successively, requested in the order which presents the least cost to applicant.

The Applicant believes that this application, and these claims, after the grant of any of the above petitions, are now all in presently allowable, correct, and proper form, and respectfully asks for a timely Notice of Allowance to be issued.

Respectfully Submitted:

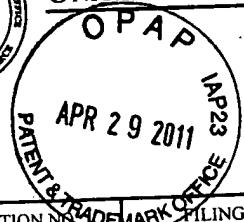


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APPLICATION NO.	TRADEMARK OFFICE	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,255		03/10/2004	Brian P. Roarty		5375

37387 7590 04/06/2011
GEORGE S. COLE, ESQ.
495 SEAPORT COURT, SUITE 101
REDWOOD CITY, CA 94063

EXAMINER
LEACH, ERIN MARIE BOYD

ART UNIT	PAPER NUMBER
3663	

MAIL DATE	DELIVERY MODE
04/06/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.
The time period for reply, if any, is set in the attached communication.



Notice of Abandonment

Notice of Abandonment	Application No.	Applicant(s)
	10/797,255	ROARTY, BRIAN P.
	Examiner ERIN M B LEACH	Art Unit 3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

This application is abandoned in view of:

1. Applicant's failure to timely file a proper reply to the Office letter mailed on 10 May 2010.
 - (a) A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
 - (b) A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 (a) to the final rejection. (A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114).
 - (c) A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
 - (d) No reply has been received.
2. Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
 - (a) The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
 - (b) The submitted fee of \$_____ is insufficient. A balance of \$_____ is due.
The issue fee required by 37 CFR 1.18 is \$_____. The publication fee, if required by 37 CFR 1.18(d), is \$_____.
 - (c) The issue fee and publication fee, if applicable, has not been received.
3. Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
 - (a) Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
 - (b) No corrected drawings have been received.
4. The letter of express abandonment which is signed by the attorney or agent of record, the assignee of the entire interest, or all of the applicants.
5. The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34(a)) upon the filing of a continuing application.
6. The decision by the Board of Patent Appeals and Interference rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.
7. The reason(s) below:

April 4, 2011

4/4/2011
571-270-5376

/E. M. L./
Examiner, Art Unit 3663
/Rick Palabrica/
Primary Examiner, Art Unit 3663

Petitions to revive under 37 CFR 1.181, if filed before the mailing date of this communication, and to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effect on the application.

Exhibit 1

Roeby, Brian P. Investigation and Preparation of Patent Application No. 10/797,255 filed 3/10/2004		Renewal Filed	Invader
ip	Room	Examiner	A Nozzle
marks	PPA Filed 3/13/2003		Roeby, Brian P.
sign Cases	PCT TBA by 3/13/04 by Ladd & Perry Filed 3/11/04 PCT/US2004/004950 Ladd & Perry ref: 621779-4/MS6/454,933		Client
OFFICE ACTIONS	CALL UP	AMENDMENTS	
File of Specs US Comm 8/18/08 (new) Req to US Comm 9/2/08 OA 11/7/08 Resp 5/6/09 FD 7/17/09 Req 1/19/10 (new) ↳ EPO Filed 1/19/10 1/27/10 ZCO case filed USPTO 4/22/11 Nat Aband? recd			
owed	Renewal Att'd	Final Fee Paid	
ASSIGNMENT	INTERFERENCE		
ated	Declared	No.	Serial N



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PO ZIP Code

940301

Date Accepted

1/19/01

Mo. Day

Year

8-43

Time Accepted

AM

PM

10:43

AM

PM



In Re Application Of: Brian P. Roarty
Serial No. 10/797,255
Filed: 03/10/2004
For: Implementation...

Examiner: Erin M. Boyd
Group Art Unit: 3663
Atty. Docket No:
Date: Jan. 17th, 2010

THE COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

SIR: Transmitted herewith are:

a Response to the Final Office Action for the above application.

an edited copy of the revised claims, with a claims listing and claims status, pursuant with 37 CFR 1.21.

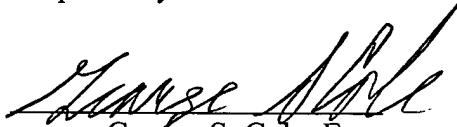
a Request for Continuing Examination for the above application, with separate payment.

The Commissioner is herewith authorized to charge payment of the necessary fees, or credit any overpayment to Deposit Account 50-0705 associated with this communication for any related purpose, including: (A DUPLICATE COPY OF THIS SHEET IS ENCLOSED)

Any additional filing fees required for presentation of extra claims
 Any extension or petition fees.

Small entity status for this application under 37 CFR §1.9 and 1.27 has been established by a verified statement previously submitted.

Respectfully Submitted:



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PTO #40,563

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In Re Application Of: Brian P. Roarty	Examiner: Erin M. Boyd
Serial No. 10/797,255	Group Art Unit: 3663
Filed: 03/10/2004	Atty. Docket No:
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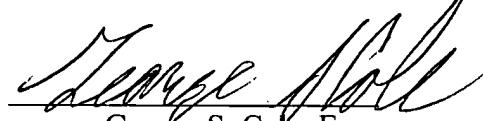
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In Re Application Of: Brian P. Roarty	Examiner: Erin M. Boyd
Serial No. 10/797,255	Group Art Unit: 3663
Filed: 03/10/2004	Atty. Docket No:
For: Implementation...	Date: Jan. 17th, 2010

RESPONSE TO OFFICE ACTION

This is in response to the Final Office Action mailed 07/17/2009. As this Office Action is subsequent to a restriction election, claims 04-10 are currently pending in this application and are addressed in this Response.

CLAIMS NOT INCLUDED IN OFFICE ACTION

Claims 1-3 and Claims 11-23 were not included in the Final Office Action but were withdrawn from consideration through a Restriction Election.

OBJECTION TO THE SPECIFICATION

The sole ground for the objection to the specification – not to the claims – for the present invention is stated simply: the doubt that “the phenomena on which the application is based (i.e. LENR) is inoperative” (FOA, p. 4, ¶5, line 5-6). This is repeated later as the assertion on page 12 in paragraph 12: “LENR in this system lacks credibility in view of the over all situation with regard to the production of cold fusion (LENR).”

This ground is supported by citation to a theoretical objection by Fukai, casting “doubt on the occurrence of cold fusion induced by tunneling through the Coulomb barrier”, and Fukai’s assertion that “there is no way to sustain such close D-D pairs in any solids”. My application and invention do not depend upon any assertion of an induction of cold fusion by tunneling through the Coulomb barrier and do not require deuterium or D-D pairs. An objection which is to the theory behind an invention is insufficient to stand against evidence of a reality observed by the inventor and submitted via his declaration as valid and uncontradicted evidence, particularly when said evidence is replicable – not

replicated – by others practising the invention as taught in the application. Accordingly this ground for the objection cannot sustain the objection and is traversed.

More pertinent as possible grounds for any objection is the citation in the FOA to an assertion by Shanahan of apparent excess heat from cold fusion “due to possible recombination considerations at the electrode in an electrolytic cell”. Shanahan’s suggestion depends upon “the absence of definitive data ruling out recombination as the source of the apparent “excess heat” ” (OA, ¶12, p. 13.)

The Examiner properly requested “sufficient substantiating evidence of operability”. It is presumed that such evidence of operability address the Examiner’s fundamental concern – the production of heat through some method – rather than the considerably more well-understood means of transforming heat into work, as through a steam engine. The Examiner’s concern, as the Applicant and Attorney understand it, is that the Applicant show that his method can produce heat in a liquid, rather than show that the heated liquid can be used to power an engine.

Accordingly, Applicant submits the accompanying Declaration from the Applicant relating specific details from the experiments he performed that verifiably, and reproducibly, produced heat in a liquid (water, in fact) as requested.

Attorney states without reservation that Applicant does not have, nor does he expect to have, a fully-fleshed out, and generally accepted theoretical explanation for the phenomena which Applicant is able to produce and reproduce. But Applicant’s sworn testimony constitutes evidence and thus proof (in the absence of contrary evidence) of such phenomena; proof sufficient to overthrow theoretic doubts or nay-sayers.

The Final Office Action stated explicitly that “Applicant asserts that he has succeeded where others have failed. Thus, there must be some critical feature of applicant’s invention that enables his system to produce actual, positive results. Said critical feature must be clearly specified and explained so as to enable an artisan to make and use the

invention as required by statute.” (FOA, p. 7, ¶8, lines 3-7 on that page). Applicant’s Declaration, submitted with this Response, describes the experimental methodology and experimental results that establish the required ‘actual, positive results’. They also show the required ‘critical feature’, as well as indicia of unexpected results.

Applicant also respectfully requests that the Office take notice of U.S. Patent 7,442,287, issued Oct. 28, 2008, from Application 11/413,485, for “Material surface treatment method using concurrent electrical, vibrational and photonic stimulation”. This patent was issued to the current Applicant, and specific attention is called to the following assertion therein: “SUMMARY DISCLOSURE [¶] The invention is a protocol that prepares the surface of a material, such as palladium, for an exothermic reaction. The protocol consists of a specific series of steps applying compounded and concurrent electrical, photonic, and vibratory stimuli between palladium electrodes immersed in a solution containing lithium sulfate as an electrolyte and anionic silica hydride as a surfactant while that solution is maintained at an elevated temperature at or near the boiling point. The solution is buffered to a pH in the range of 6.5 to 8.9. After preparation of the surface, a final step of the protocol calls for stimulation of the cathode with a DC voltage. [¶] The protocol shows evidence that the bonding of the palladium has changed at or near surface, for example, in that it will now stain with methylene blue. It also yields a sustained exothermic reaction at or near the boiling point of the solution.”

A second objection to the specification was made on the grounds of 35 USC §112, first paragraph, as “failing to provide an adequate written description” (emphasis in Office Action original). Specifically, the objection was the failure “to explicitly disclose what the indirect excitation means is”.

It is strongly suggested that this objection arises from a failure of the language used to convey the distinction between a “direct” and “indirect” excitation. The specification clearly, plainly, and explicitly states: “The additional energy added to the fluid F may be

provided by... inducing a low energy nuclear reaction (LENR) within the nozzle, using conduction and convection to heat the fluid F..." (Specification, p. 5, lines 16-19; the omitted first and final clauses of this sentence will be discussed below.) Excitation of the material of the nozzle will heat the fluid in the nozzle through inter-molecular collisions, i.e. heat transference by means of "conduction" or "convection". To the extent that individual molecules of the fluid permeate or directly contact the heat transference block they may be directly excited into a phase change; to the extent the energy of such phase changes affects other molecules of the fluid, they are indirectly excited. At the element-of-a-system level (that is, at the level where the claims are drafted), however, the excitation is of the nozzle.

This is distinguished from excitation means that induce LENR in the fluid flowing through the nozzle, i.e. beyond the boundary at the element-of-the-structure level of the claims language, or interior surface, of the nozzle. Intra-molecular permeation (of molecules of the fluid into the nozzle material), is not addressed at this level of detail.

Contrary to the assertion in the Response that the specification "requires experimentation to determine if the energy claimed to be transferred into the nozzle actually heats the nozzle (through LENR)", fundamental thermodynamics assures that energy transferred into the nozzle will heat the nozzle; no experimentation on this point is needed.

The crux of this objection is that the inventor "omits information essential to the utility and/or manufacture of the claimed invention" and most particularly, "an example of an indirect excitation means, how the indirect excitation means functions to enable LENR, temperatures requirements, etc." (Response, p. 8, paragraph (F).)

The applicant is not and cannot be required to provide any explanation of "how the indirect excitation means functions to enable LENR" – not, that is, to any extent that the word "how" is read to mean requiring a theoretical explanation. Inventors never need to provide a theoretical explanation and are entitled to an invention even if their theoretical explanation is not just incomplete or missing, but even wrong.

In terms of implementation, the specification does provide adequate detail. For example, the Specification stated in the first and final clauses to the text cited above, which add just the specific detail which the applicant found to be critical, these specific extra details, “The additional energy added to the fluid F may be provided by electrical stimulation of a portion of the throat adding heat directly to the fluid F, inducing a low energy nuclear reaction (LENR) within the nozzle,...or any combination thereof.” (Specification, p. 5, lines 19-20.)

Immediately after that, additional detail is added: “The phase change may be further supported by a surfactant in the fluid F that promotes and enhances the low energy nuclear reactions in the nozzle.” (Specification, p. 5, lines 20-21.) Figures 7 and 8 give the pattern of the electrical stimulation, which was experimentally confirmed to be more important than the absolute values. Additional details can now be readily determined by reference to U.S. Patent 7,442,287 (e.g. “That stimulus is a time-varying voltage with a baseline near ground potential. It is shown in FIGS. 2 and 3 in a ramped and unramped form, respectively. Observations show that a 3.15 MHz pulse train modulated by a 50 MHz sine wave is effective.”)

Applicant understands that the Office desires further “quantitative or qualitative data” and has provided the same in his accompanying Declaration, which is hereby incorporated in this Response in entirety.

The Response further objected in paragraph (H) to a lack of research “into the material science aspects of deuterated metal”. That, however, presumes that a deuterium-based LENR process is involved. As the applicant’s accompanying declaration explicitly states, that assumption is not necessary. It is improper to require that the applicant adhere to a theoretical explanation or model which his own effort has already shown to be unnecessary.

For all of the above reasons, Applicant respectfully asserts that this objection has been traversed and that sufficient proof of utility and operability is presently before the Office, thereby enabling this invention for those skilled in the art.

OBJECTION TO THE CLAIMS

The claims 4-10 were rejected under 35 U.S.C. §112 for reasons “the same as the reasons for the objection to the specification for lack of enablement”. (Response, p. 9, § 11.) For the grounds advanced above, it is asserted that this objection has been traversed.

Claim 4 has been amended, and Claims 24-36 added, all in conformance with the original Specification including all of the drawings thereof, and in compliance with the imposed restriction. It should be noted that, to the extent that the Office objected to a lack of details concerning implementation in the claims, these details have been and are now disclosed in all of the claims, including those currently amended.

Accordingly, it is respectfully asserted that the objections are traversed and the claims, as amended, are now proper.

REQUEST FOR CONTINUING EXAMINATION

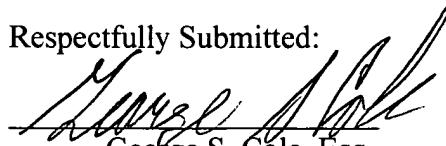
If the Examiner does not feel that the Response to the Final Office Action adequately prepare the application so as to permit issuance under the submitted claims, Petitioner respectfully requests a continued examination on the application that incorporates the amended and added claims, and the necessary fee for such Continued Examination is enclosed filed herein.

If the Examiner has any questions or wishes to discuss this matter he is urged to contact the Applicant's attorney, George S. Cole, Esq., using the phone, fax, or email below.

A claims listing with the status of each claim, with the claims in ascending order, and with the text of the claim, has been appended to this Response. This listing of claims will replace all prior versions, and listings, of claims in the application.

The Applicant believes that these claims are now all in presently allowable, correct, and proper form, and respectfully asks for a timely Notice of Allowance to be issued.

Respectfully Submitted:



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DECLARATION OF BRIAN P. ROARTY

Inventor of the invention described in patent application 10/797,255,

“Implementation And Application Of Phase Change In A Fluid Flowing Through A Nozzle”. I am also a co-inventor of U.S. Patent 7,442,287, titled “Material surface treatment method using concurrent electrical, vibrational and photonic stimulation”.

All identified Exhibits mentioned herein are records derived from experiments I conducted and are expressly incorporated as part of my Declaration.

I and my colleague conducted several experiments which provide precisely that definitive data ruling out recombination as the source of the apparent “excess heat”. First, as part of our experiments we monitored both the environmental surroundings and the experimentally-controlled heat inputs throughout each run. Neither the environmental temperature (from which the reaction vessel was insulated), nor the input heat source, could explain the observed, periodic, and significant heat peaks and post-experimental changes in the electrode. There was no evidence of any “recombination” as suggested by Shanahan; the fluid was non-reactive with the vessel. There was considerable evidence countering any such inference, as well, as described below:

First, Shanahan’s suggestion of ‘recombination’ implies that once a ground state, in terms of temperature, pressure, other external stimuli, and materials is provided, such recombinations should occur either in a pattern that reflects the ‘steady state’ of the experiment, or that randomly varies throughout the observational period. In every run of our experiments, there was a minimal ‘prelude period’ which was a minimum of two hours, but only after that period and after stimulation started, did periodic ‘heat spiking’ begin to occur.

Second, Shanahan’s suggestion of ‘recombination’ would require a chemical process. Pre- and post- analysis of the material of the electrode showed that the metal had, during the experiment, encountered such intense heat spikes as to deform. An example of such deformation, observed by Scanning Electron

Microscope, is shown in Exhibit 1. Specifically, observe the delamination at the base of the photograph (the separation shown in the dark band between the two lighter bands of palladium at the bottom third of the photograph).

Third, Shanahan's suggestion of 'recombination' and its basis (chemical transformation), fails to explain evident atomic transmutation detected after the experiment(s). The treated palladium electrodes (measured by a spectrographic assay with a 1% detection threshold) lacked any silver pre-experiment; but in the run of Dec. 28th, 2008, a post-run spectrographic assay disclosed the presence of silver at numerous sites.

A general description of the experiments and specific details which negate the theoretical objection and asserted 'recombination' explanation cited by the Office action follows.

Basic Description of the Experimental Tests

While enhancing the aforementioned ~287 patent, testing moved from an open glass beaker into a sealed vessel to prevent the escape of steam and other things that might affect the reaction. It became much more practical to instrument each experiment and to data log the process and results, as one might expect; for providing a more-controlled environment and process, means providing an experiment that is also more measurable and more measured. What was surprising, was that the reaction proved to be more robust when taking place in such a sealed container with specific refinements described herein.

Firstly, measurement of energy input and output became loggable rather than merely observable through perception of changes (i.e. bubbling). Secondly, prevention of contamination from the outside environment was greatly increased, which highlights the internal-to-the-process nature of temporary, even if recurrent, in-experiment events.

As with the protocol described in U.S. Patent 7,442,287, each experiment involved a 'preparation phase'. A liquid medium incorporating electrolyte and surfactant elements in

solution such that the combination had a pH between 6.5 and 8.9, was placed into a container, which was then closed. At first this was 25 ml of liquid, but then this was raised to 30 ml. The liquid in the vessel was blanketed with a combination of hydrogen and helium, in approximately equal percentages. These gases were introduced through two inlet valves and the atmosphere vented through an outlet valve, replacing the standard atmospheric mixture of nitrogen/oxygen/misellaneous gases, before the induction effort began.

In our early experiments, for a set period, two hours, the solution was maintained at or just below the boiling point (100° - 101° C; in the preferred embodiment, this would be 102° C +/- 1° C to ensure it remained below, but just below, boiling), at 1 bar pressure. Immersed in the solution were a pair of electrodes, surface treated with a gap between them. In later experiments, we accepted the transient heat spikes as evidence of the reaction and were less concerned about attaining a thermal equilibrium.

No heat spikes were observed during any run during this 'preparation phase' – yet at least one such should have been observed during this time if Shanahan's 'recombination' objection is valid. With the conditions for such recombination having been established and maintained for that period before the stimulation was applied, the limitation of the observation of heat spikes to the post-preparation period cannot be laid off to chance or experimental variation.

The vessel used was a stainless steel cylinder with a central well 2 inches deep and 2 inches in diameter, having a closed bottom and a removable top. Ultimately, it was dimensioned to accommodate a glass beaker capped with a quartz top. Holes in the top allowed electrodes and thermocouples to pass through it.

Four "ultrabright" white LEDs capable of generating 15,000 mcd were spaced equally around the vessel below the surface of the liquid as photonic stimuli. These stimuli were provided through sealed glass ports in the vessel wall. Electrical stimuli were provided via three palladium wires of .025" diameter: an anode for the RF stimulus, a second anode for the DC stimulus, and a common cathode. The electrodes formed a triangle with sides 0.9, 1.45, and 1.45 inches long. The shortest side lay between the RF

anode and the common cathode. The electrodes and the thermocouples were equally spaced on a bolt circle, so thermocouples would be 0.9 and 1.45 inches away from the cathode.

All three electrodes were isolated from the vessel and sheathed in glass tubing to the surface of the liquid in order to keep them straight and to concentrate the RF stimulus in the liquid. The electrodes passed through the vessel's top via Teflon® seals compressed with Swagelok® fittings.

Thermocouples were used to monitor the temperature of the liquid via thermocouple wells projecting into the liquid. The wells were first made of stainless steel and later of glass. The thermocouples also passed through the vessel's cap via Teflon® seals compressed with Swagelok® fittings.

A heating coil was located in a cavity in the bottom of the vessel, and its input voltage and current measured to monitor input power.

Stimulation – Experimental Phase

After the temperature of the liquid had remained stable within the above-described range over a couple of hours, photonic and RF stimuli were applied in manner similar to the one described in the U.S. Patent 7,442,287.

Two fundamental observations obviate, for invention's method and apparatus, any explanation offered by inter-molecular (chemical) theory. First, pre- and post- protocol observations confirmed transmutation occurred. Secondly, in-process measurements, and pre- and post- process comparisons of the experimental equipment, show irrefutable evidence of exothermic reaction; intense, repeated, bursts of heat occurred within the experimental vessel. The data logs showing those bursts of heat were made with an Agilent 34970A, and the data logs provided with this declaration were printed from that instrument's companion software package . That software uses a proprietary data base, such that the stored data cannot be modified by the user.

Observation One: Transmutation

One of the differences in the set of experiments that led to this invention was the confirmed, repeated, and multiple evidences of transmutation during the process; most notably, of palladium to silver ($_{46}\text{Pd} \rightarrow _{47}\text{Ag}$), the expected result when a neutron in the palladium nucleus converts to a proton, which occurred during the course and as a consequence of these experiments. Additionally, transmutation products of elements other than palladium were detected in several experiments. For example, in the experiment run on Feb. 28, 2009, tests were run using a Scanning Electron Microscope (SEM) that detected, fluorine was detected at four sites – and no fluorine had been knowingly either present or introduced. $_{9}\text{F}$, however, would be the transmutation product of $_{8}\text{O}$, which had been present.

Pre- and post-experimental observation, plus the fact that the beaker was closed, eliminated the possibility of accidental contamination with the observed different elements. Two different techniques, EDS and Auger analysis, were used to evaluate the presence/absence of elements. The measurement of elemental distribution was made with a coarse degree of precision; an element was only identified as present when it was detectable at more than a 1% concentration of the sample. There may have been more transmutation products, but elements which did not constitute at least 1% of the final sample, would presumably not have been detected since they did not rise above the detection threshold of the analytical method.

Exhibit 2 is the Atomic Concentration Table from the Auger analysis of the January 3, 2009, experiment. Note the post-protocol presence of nitrogen, aluminum, chlorine, and copper. None of these had been present in the pre-stimulus condition (remember, the ordinary atmosphere, which includes nitrogen, had been replaced with a hydrogen/helium mix). Each of these is a transmutation product of one of the ingredients in the protocol: specifically:

- $_{6}\text{C}$ transmutes into $_{7}\text{N}$;
- $_{12}\text{Mg}$ transmutes into $_{13}\text{Al}$;
- $_{16}\text{S}$ transmutes into $_{17}\text{Cl}$; and,
- $_{29}\text{Cu}$ transmutes into $_{30}\text{Zn}$.

Further, the $_{9}\text{F}$ found above in the Energy Dispersive X-ray Spectroscopy (EDS) analyses is explainable by this protocol as the transmutation product of $_{8}\text{O}$ which was present in the pre-experiment environment, while fluorine was not.

There may well have been considerable other transmutation, particularly of the lightest elements; if hydrogen or lithium had transmuted to helium and beryllium (respectively), they would not have been detected by EDS, which does not detect elements with atomic numbers below five.

The presence of gallium in the one sample cannot be accounted for by a single-step transmutation; it was not knowingly introduced or present in the pre-experiment state, but could be a second one-proton shift itransmuting $_{30}\text{Zn}$ to $_{31}\text{Ga}$.

Strong, even irrefutable, evidence of transmutation products of six different elements using two different analytic techniques, EDS and Auger analysis, with aluminum having been found with both of them, creates an overwhelming presumption of nuclear – intra-atomic – effect. Taken together, the data supports a strong claim that this protocol has induced nuclear reactions on numerous occasions.

Any transmutation provides clear and irrefutable evidence that of a reaction which is nuclear in nature; molecular chemistry is incapable of changing one element into another. Heretofore, artificial nuclear transmutation has been believed to be induced only at either very high temperatures such as those found in plasmas or with high-energy stimuli. This protocol operates at or near the boiling point of water and under normal or near-normal (1 bar) atmospheric pressure. At no time during the protocol did the applied energy input exceed fifty Watts, with the great majority of that energy being heat used to elevate the temperature of the reaction near or to the boiling point. The electrical and/or photonic stimuli provided less than 100 milliwatts. Thus, the experimental evidence confirms the existence of low energy nuclear reactions (LENRs).

Observation Two: Exothermic Heat Pulses

The second observation, or set of observations, reveal the presence of exothermic reactions in the vessel. This set of observations includes: (a) repeating, pulsed, increases in the temperature of the liquid; (b) increases in the pressure, and decreases in the liquid volume, showing that vaporization occurred at rates unexplainable by the conditions and energy inputs; (c) changes in shape and evidence of liquid mobility in palladium observable at the microscopic level in specific parts of the apparatus.

(a) Repeating, pulsed, increases in the temperature of the liquid.

Remember that the liquid had been raised to and then kept at a stable, that is, unchanging temperature for two hours in our early experiments; the amount of energy provided through the warming coil thus balancing the conductive/evaporative/radiative heat losses entirely. Without additional heat from the warming coil, repeated increases in the temperature of the liquid were observed – temperature spikes of more than 1° C lasting for more than 2 minutes. The temperature of the vessel’s walls also changed, indicating that something was unbalancing the previously-stable input/heat loss state which had been maintained for two hours.

These temperature transients were observable whether the amount of liquid was 25 or 30 ml, and to a lesser extent whether the liquid was normal or heavy water. In several of the experimental runs, which were performed in a closed and sealed-off container (to protect against steam explosion hazards), post-experimental observations noted that some portion of the liquid had ‘boiled off’ during the experiment. It is entirely possible that the spike in temperature included a flash-over into steam of some portion of the liquid, and that the subsequent drop in temperature in part records the lifting of relief valve(s) and boil-off vaporization and cooling that would result.

In later runs, when the importance of silica/glass and non-contamination were more thoroughly recognized and adhered to, more consistent, almost regular patterns of thermal bursts were obtained. In the experiment run on January 19, 2009 the bursts of heat showed a periodicity of approximately 10-12 minutes. See Exhibit 3. Another

example of more regular periodicity is from the run of January 30, 2009, where the bursts of heat occur about every eight minutes, shown in Exhibit 4. The January 30 experiment included glass beads strung on the cathode. These two experiments and numerous others show that the exothermic heat is repeatable.

Further evidence of intense heat blooms are presented by the transformation in the materials of the apparatus, post-experiment. Sections of the wire used to provide the input electrodes were examined prior to the experiment; and, in several of the experiments, sections of the actual input electrodes were examined, by a Scanning Electron Microscope; and dramatic changes in the material of the electrode were observed in the latter that were never present in any of the former. An example of apparent spalling of palladium from the wire on the run of January 30, 2009 to the surface of a glass bead is Exhibit 5; this was observed on February 23, 2009. As with Exhibit 1, these are indications that the electrode attained 1,555°C and incandescence. (The SEM photo is mislabeled “013109”.)

Unexpected, Non-predicted, Positive Effect Discovered and Confirmed

Since the experiments are presumed to be affecting the liquid through input energies and stimuli transmitted through neutral means, the nature of the vessel containing the liquid has been presumed to be unimportant. The sole functionality, and the sole effect, of the containing vessel was presumed to be as a container. This assumption, made for simplification’s sake (reducing the number of variables to be controlled), has been shown to be wrong.

Having the reaction contained within glass proved to be a critical issue. Attempts to run the protocol within materials such as stainless steel and Teflon were not successful. When conducted in such a glass vessel, the use of a DC stimulus in the protocol proved to be optional.

As the experiments progressed, the inventors observed the following:

- The chosen surfactant was a soluble form of silica.

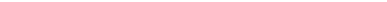
- When the inner surface of the reaction vessel was lined with a glass beaker, the reaction improved. Glass is a form of silica.
- When the stainless-steel thermocouple wells were replaced with glass ones, the reaction improved.
- When a quartz cap was placed over the beaker, the reaction improved. Quartz is another form of silica.

Furthermore, the first step in the protocol described U. S. Patent 7,442,287 consisted of heating the solution until the bubbles had cleared from its surface. Those bubbles, of course, were characteristic of surfactants, and anionic silica hydride had originally been chosen for its surfactant properties. However, the disappearance of the bubbles indicated that the surfactant properties had also diminished or disappeared. What was left was the silica, plus the additives added by its maker, Patrick Flanagan.

By this time, the inventors had questioned the assumption as to the non-causality of the reaction vessel's surface quality, and predicted that silica could be an important part of the protocol.

Finally, we noted that our experiments required two hours or more before we began to observe bursts of heat and wondered what was happening during that time. We suspected that something must be happening to either the solution or to the electrodes in that period that was necessary to facilitate the observed reaction. Again, we noted a key fact: to the best of our knowledge, all of the successful LENR experiments conducted by either us or other experimenters have included lithium in the reaction. Lithium appears to be an essential ingredient. Reasoning that both silica and lithium are needed in the reaction and that the reaction does not occur immediately, we concluded that the silica and the lithium in our protocol are bonding in some way before the reaction occurs. Silicon is a very reactive atom, much like its smaller sibling in the periodic table, carbon. It combines with a great many other elements in a broad family of molecules. We believe that the lithium is combining with the anionic silica hydride in the solution to form a lithium silicate, generally expressed as $\text{Li}_1\text{Si}_m\text{O}_n$, probably either LiSi_4O_7 or LiSi_3O_8 .

With an absence of Deuterium-enriched source water, the lack of D-D fusion products, as suggested by the OA ¶14.g, should not be considered probative of a non-effect; particularly as the analysis methodologies used would not only not differentiate between elements with less than five protons (hydrogen, helium, lithium, and beryllium) but were not used to evaluate isotopic ratios. Nor could a small-scale, non-energy-lab operation afford either such costly tests or those needed to detect neutron bursts. The absence of such evidence from these experimental runs reflects the low-budget experimental technologies affordable and available, rather than the presence or absence of any results.

I declare under penalty of perjury under the laws of the U.S. and the State of California, that the foregoing is true and correct. 

Executed on

going is true and correct.
January 17, 2010 

Brian P. Roarty

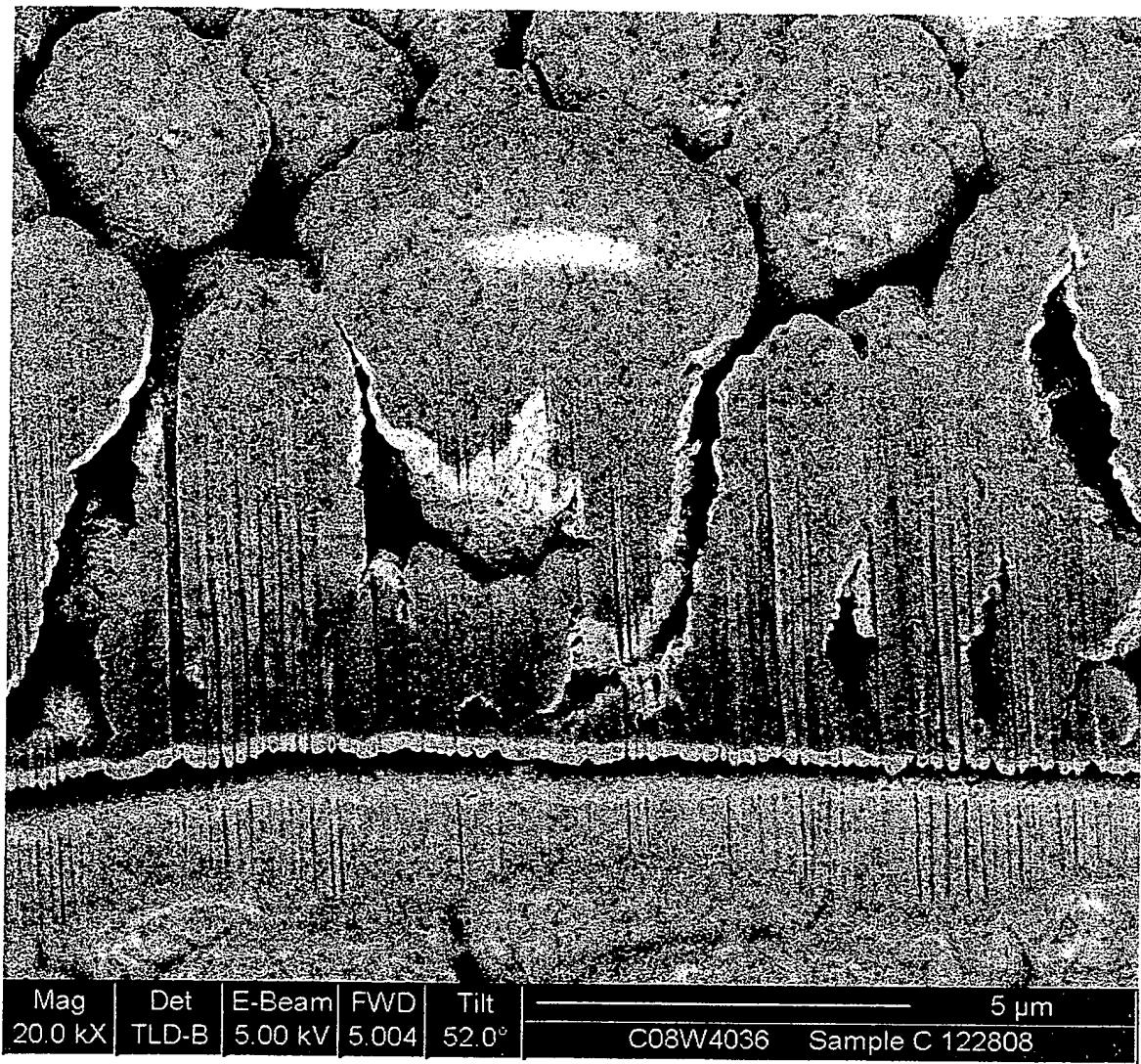


Figure 1.g

Exhibit 1

Atomic Concentration Table

Description	Figure #	Carbon	Nitrogen	Oxygen	Magnesium	Aluminum	Silicon	Sulfur	Chlorine	Calcium	Copper	Zinc	Palladium	
Sample C 12/28/08	3	Area #1	42	1	14	--	--	7	3	<1	--	4	1	27
4	Area #2	36	2	23	--	--	11	3	<1	--	3	1	23	
5	Particle	19	--	50	9	--	21	1	--	--	--	--	--	
Sample C 1/4/09	6	Coating	62	--	22	5	--	7	--	--	4	--	--	
7	Residue	49	--	34	3	4	10	--	--	--	--	--	--	
8	After Ion Etch	--	--	--	--	--	--	--	--	--	--	--	--	
9	Area #1	31	--	35	--	--	18	1	--	--	--	15	100	
10	Area #2	36	--	30	--	--	15	1	<1	--	--	--	18	

EAG Job # C09W4614

Figure #11

 **EAG**SM
Evans Analytical Group

Figure 2.6

Exhibit 2

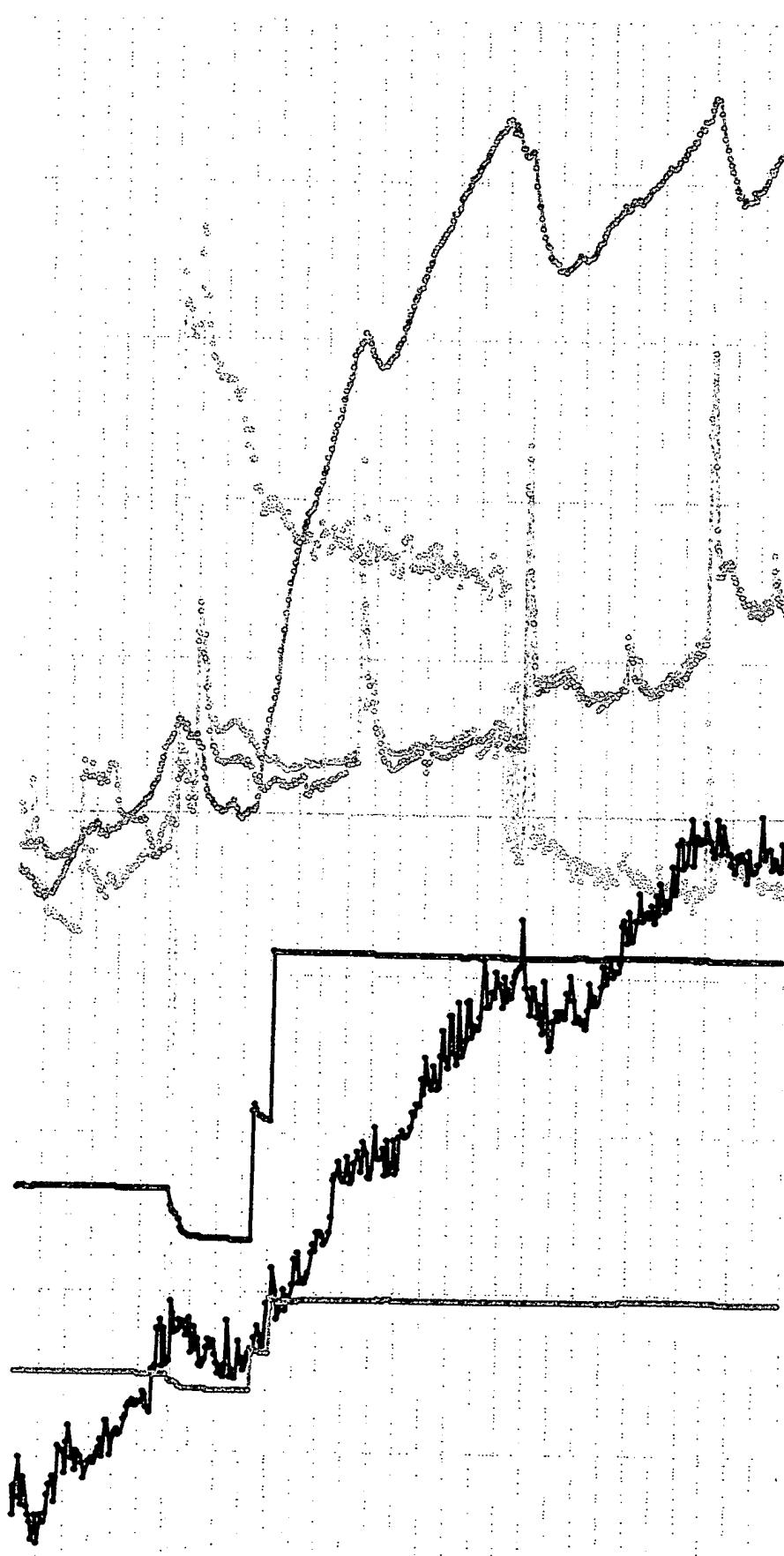


Figure 3.a

January 19, 2009

Palladium Electrodes
and Heavy Water

Exhibit 3

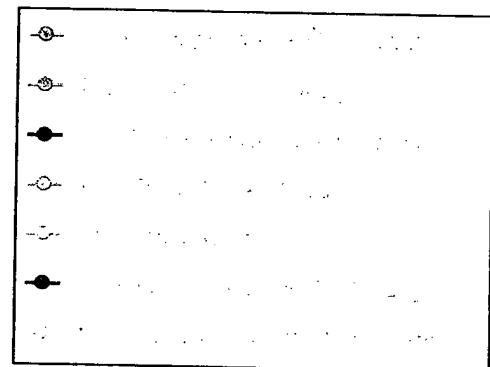
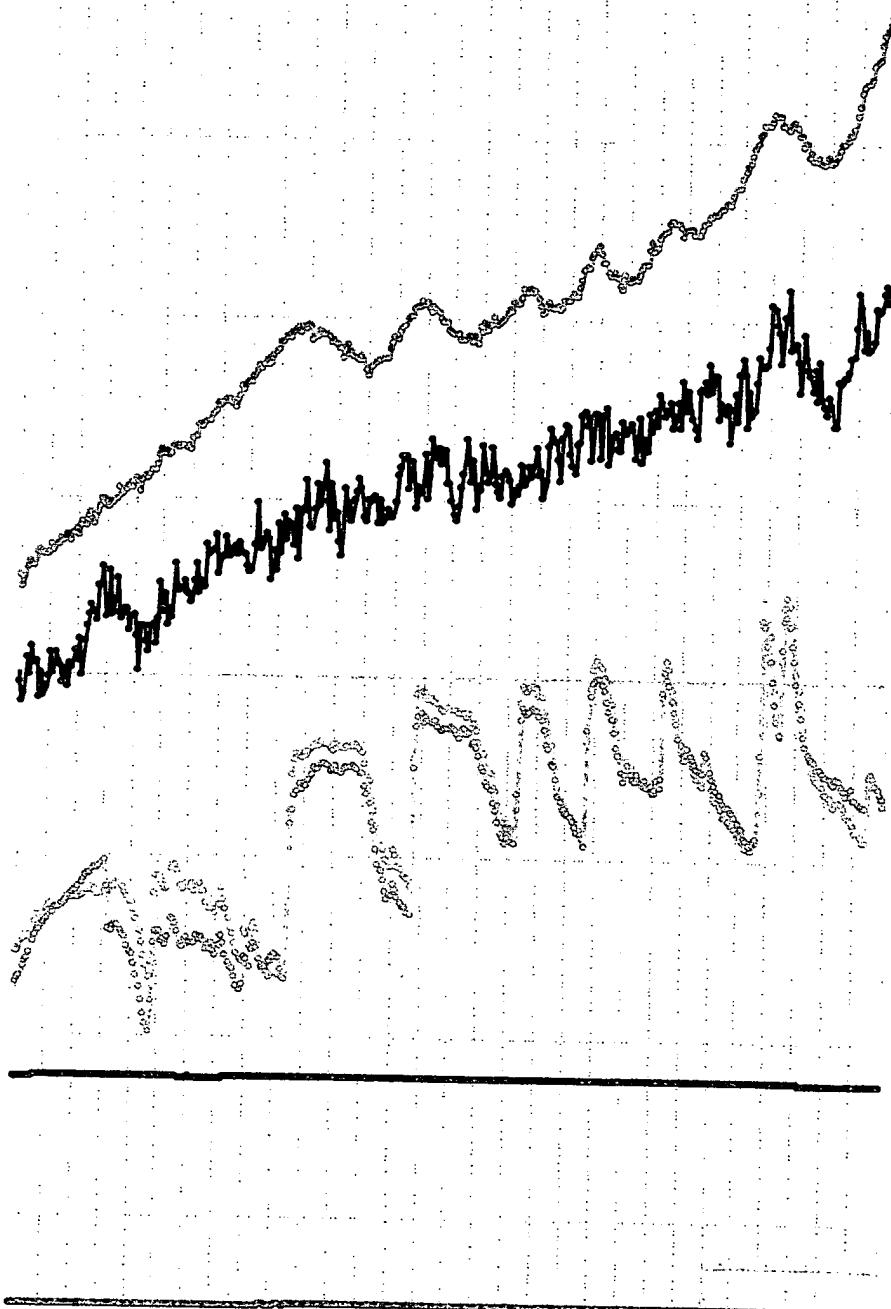


Figure 4.a

January 30, 2009

Palladium Electrodes,
Glass Beads, and
Heavy Water

Exhibit 4



Figure 4.b

Exhibit 5

CLAIMS LISTING

1-3: CANCELLED.

4. (NEWLY AMENDED) A system, comprising:

a nozzle having an inlet, a throat, and an exhaust;
a fluid flowing through the nozzle;
means for electrical stimulation inducing a low energy nuclear reaction (LENR) embedded within the nozzle, thereby indirectly transferring energy into and heating the fluid and inducing a phase change in the fluid; and,
means for transforming the flow from the exhaust into work outside the system.

5 (ORIGINAL). A system as in Claim 4, wherein the cross-sectional interior volume of the inlet, throat, and exhaust of the nozzle vary only across one plane perpendicular to the axis of fluid flowing through the nozzle.

6. (ORIGINAL) A system as in Claim 4, further comprising a surfactant having an extra ion dissolved in the fluid.

7. (ORIGINAL) A system as in Claim 6, wherein the surfactant is a short-chain molecule.

8. (ORIGINAL) A system as in Claim 6, wherein the surfactant is a short-chain molecule having only 5 to 50 atoms.

9. (ORIGINAL) A system as in Claim 6, wherein the surfactant is a short-chain molecule having only 5 to 10 atoms.

10. (ORIGINAL) A system as in Claim 6, wherein the fluid includes a lithium salt and the surfactant is non-reactive to the fluid and lithium salt.

24. (NEW) A system as in Claim 10, wherein the nozzle further comprises:
a third block of an insulating material separating a first structural core and a heat transference block.

25. (NEW) A system as in Claim 24, wherein the third block further comprises:
a first sub-layer of an electrical insulating material; and,
a second sub-layer of a thermal insulating material.

26. (NEW) A system as in Claim 24, wherein means embedded within the nozzle for transferring energy into and heating the nozzle, thereby indirectly transferring energy into and heating the fluid and inducing a phase change in the fluid further comprise:
a structural core formed of a first material;
a heat transference block formed of a second material, said heat transference block having at least one surface over which the fluid flows and from which heat is transferred from the heat transference block to the fluid; and,
means for inducing a low-energy nuclear reaction within the heat transference block to create heat in the heat transference block.

27. (NEW) A system as in Claim 26, wherein the fluid includes deuterium.

28. (NEW) A system as in Claim 26, wherein the second material is a metal alloy whose principal component comes from the following set of materials: palladium, lanthanum, praseodymium, cerium, titanium, zirconium, hafnium, vanadium, niobium, tantalum, nickel, thorium, protactinium, and uranium.

29. (NEW) A system as in Claim 26, wherein the second material is palladium.

30. (NEW) A system as in Claim 26, wherein the means for inducing a low-energy nuclear reaction within the heat transference block to create heat in the heat transference block further comprise:
an anode; and,

means for electrically stimulating the heat transference block by passing a current between the anode and the heat transference block.

31. (NEW) A system as in Claim 30 wherein the electrical stimulation of the heat transference block varies periodically.

32. (NEW) A system as in Claim 30, wherein the stimulation of the heat transference block occurs in a periodic pattern of increasing impulses.

33. (NEW) A system as in Claim 26, wherein the means for inducing a low-energy nuclear reaction in the heat transference block further comprise at least one laser in the nozzle whose emission is directed against the heat transference block.

34. (NEW) A system as in Claim 33, wherein the laser is capable of variable emission.

35. (NEW) A system as in Claim 26, wherein the means for inducing a low-energy nuclear reaction within the heat transference block to create heat in the heat transference block further comprise:

an anode;

a cathode;

means for electrically stimulating the heat transference block between the anode and cathode; and,

at least one laser whose emission affects the heat transference block.

36. (NEW) A system as in Claim 34, wherein both the laser, and the means for electrically stimulating between the anode and cathode the heat transference block, are capable of variable output.

CLAIMS LISTING (Marked)

1-3: CANCELLED.

4. (NEWLY AMENDED) A system, comprising:

a nozzle having an inlet, a throat, and an exhaust;
a fluid flowing through the nozzle;
means for electrical stimulation inducing a low energy nuclear reaction (LENR) embedded within the nozzle ~~for transferring energy into and heating the nozzle~~, thereby indirectly transferring energy into and heating the fluid and inducing a phase change in the fluid; and,
means for transforming the flow from the exhaust into work outside the system.

5 (ORIGINAL). A system as in Claim 4, wherein the cross-sectional interior volume of the inlet, throat, and exhaust of the nozzle vary only across one plane perpendicular to the axis of fluid flowing through the nozzle.

6. (ORIGINAL) A system as in Claim 4, further comprising a surfactant having an extra ion dissolved in the fluid.

7. (ORIGINAL) A system as in Claim 6, wherein the surfactant is a short-chain molecule.

8. (ORIGINAL) A system as in Claim 6, wherein the surfactant is a short-chain molecule having only 5 to 50 atoms.

9. (ORIGINAL) A system as in Claim 6, wherein the surfactant is a short-chain molecule having only 5 to 10 atoms.

10. (ORIGINAL) A system as in Claim 6, wherein the fluid includes a lithium salt and the surfactant is non-reactive to the fluid and lithium salt.

24. (NEW) A system as in Claim 10, wherein the nozzle further comprises:
a third block of an insulating material separating a first structural core and a heat transference block.

25. (NEW) A system as in Claim 24, wherein the third block further comprises:
a first sub-layer of an electrical insulating material; and,
a second sub-layer of a thermal insulating material.

26. (NEW) A system as in Claim 24, wherein means embedded within the nozzle for transferring energy into and heating the nozzle, thereby indirectly transferring energy into and heating the fluid and inducing a phase change in the fluid further comprise:
a structural core formed of a first material;
a heat transference block formed of a second material, said heat transference block having at least one surface over which the fluid flows and from which heat is transferred from the heat transference block to the fluid; and,
means for inducing a low-energy nuclear reaction within the heat transference block to create heat in the heat transference block.

27. (NEW) A system as in Claim 26, wherein the fluid includes deuterium.

28. (NEW) A system as in Claim 26, wherein the second material is a metal alloy whose principal component comes from the following set of materials: palladium, lanthanum, praseodymium, cerium, titanium, zirconium, hafnium, vanadium, niobium, tantalum, nickel, thorium, protactinium, and uranium.

29. (NEW) A system as in Claim 26, wherein the second material is palladium.

30. (NEW) A system as in Claim 26, wherein the means for inducing a low-energy nuclear reaction within the heat transference block to create heat in the heat transference block further comprise:
an anode; and,

means for electrically stimulating the heat transference block by passing a current between the anode and the heat transference block.

31. (NEW) A system as in Claim 30 wherein the electrical stimulation of the heat transference block varies periodically.

32. (NEW) A system as in Claim 30, wherein the stimulation of the heat transference block occurs in a periodic pattern of increasing impulses.

33. (NEW) A system as in Claim 26, wherein the means for inducing a low-energy nuclear reaction in the heat transference block further comprise at least one laser in the nozzle whose emission is directed against the heat transference block.

34. (NEW) A system as in Claim 33, wherein the laser is capable of variable emission.

35. (NEW) A system as in Claim 26, wherein the means for inducing a low-energy nuclear reaction within the heat transference block to create heat in the heat transference block further comprise:

an anode;

a cathode;

means for electrically stimulating the heat transference block between the anode and cathode; and,

at least one laser whose emission affects the heat transference block.

36. (NEW) A system as in Claim 34, wherein both the laser, and the means for electrically stimulating between the anode and cathode the heat transference block, are capable of variable output.



EXPRESS MAIL CERTIFICATE

"Express Mail" mailing label No: EH 482995280 US

Date of Deposit: Jan. 19th, 2010

I hereby certify that the following documents:

- a copy of the Final Office Action, less references sent by PTO;
- petition and payment for extension of time;
- Response to the Office Action; including,
affidavit under oath of Brian P. Roarty;
- Claims listing (clean);
- Claims listing (marked);
- Request for Continued Examination and payment for the same;

and,

- a copy of the Express Mail Certificate;

are being deposited in a single envelope with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and such envelope is addressed to:

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George S. Cole, Esq.

A handwritten signature in black ink, appearing to read "George S. Cole".